Name:

at1118paper: Complete the Square (v416)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 56x = -780$$

Add $\left(\frac{-56}{2}\right)^2$, which equals 784, to both sides of the equation.

$$x^2 - 56x + 784 = 4$$

Factor the left side.

$$(x - 28)^2 = 4$$

Undo the squaring. We need to consider both $\pm\sqrt{4}$.

$$x - 28 = -2 \quad \text{or} \quad x - 28 = 2$$
$$x = -30 \quad \text{or} \quad x = -26$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 - 34x = 936$$

$$x^2 - 34x + 289 = 1225$$
$$(x - 17)^2 = 1225$$
$$x - 17 = \pm 35$$
$$x = -18 \quad \text{or} \quad x = 52$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 + 24x = -119$$

$$x^2 + 24x + 144 = 25$$
$$(x + 12)^2 = 25$$
$$x + 12 = \pm 5$$
$$x = -17 \quad \text{or} \quad x = -7$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 + 18x = 760$$

$$x^2 + 18x + 81 = 841$$
$$(x + 9)^2 = 841$$
$$x + 9 = \pm 29$$
$$x = -38 \quad \text{or} \quad x = 20$$

Question 4

By completing the square, find both solutions to the given equation:

$$x^2 + 8x = 384$$

$$x^2 + 8x + 16 = 400$$
$$(x + 4)^2 = 400$$
$$x + 4 = \pm 20$$
$$x = -24 \quad \text{or} \quad x = 16$$

Question 5

By completing the square, find both solutions to the given equation:

$$x^2 - 52x = -352$$

$$x^2 - 52x + 676 = 324$$
$$(x - 26)^2 = 324$$
$$x - 26 = \pm 18$$
$$x = 8 \quad \text{or} \quad x = 44$$

Question 6

By completing the square, find both solutions to the given equation:

$$x^2 + 54x = 360$$

$$x^2 + 54x + 729 = 1089$$
$$(x + 27)^2 = 1089$$
$$x + 27 = \pm 33$$
$$x = -60 \quad \text{or} \quad x = 6$$